

# Directed Energy for the 21<sup>st</sup> Century

## 3<sup>rd</sup> Annual Directed Energy Symposium

Presented by  
*Directed Energy Professional Society*

In cooperation with  
Office of the Secretary of Defense  
United States Air Force United States Army United States Navy United States Marine Corps

## PRELIMINARY PROGRAM AND REGISTRATION

30 October – 3 November 2000

Kirtland Air Force Base  
White Sands Missile Range

**SYMPOSIUM SESSIONS 2 AND 3 ARE PUBLIC DOMAIN**  
**ALL OTHER SESSIONS ARE LIMITED TO CLEARED US GOVERNMENT AND US GOVERNMENT**  
**CONTRACTORS ONLY (SEE INSIDE FOR COURSES)**



# 3<sup>rd</sup> Annual Directed Energy Symposium

## *Directed Energy for the 21<sup>st</sup> Century*

Presented by  
*Directed Energy Professional Society*

**Symposium Chair: Dr. David L. Dinwiddie (AFRL/DEP); Deputy Chair: Dr. Randall D. Buff (ASMDC)**

In cooperation with the Office of the Secretary of Defense  
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### **OVERVIEW**

The 3<sup>rd</sup> Annual DE Symposium will bring together government, industry, and academic leaders for discussions of basic research and technology efforts, current programs, and the future of Directed Energy. Technical presentations will cover a diverse spectrum of interests including those of the DOE and DoD laboratories and program offices, the intelligence community, industry, universities, policy makers, and scientific and engineering institutions. The 3<sup>rd</sup> Annual DE Symposium will provide various forums for the exchange of scientific and technical information in fields related to high-energy lasers (HEL), high-power microwaves (HPM), and HEL active sensing systems. The DE Symposium begins on Mon. (30 Oct) with Session 1: *HELSTF Activities* conducted at White Sands Missile Range (WSMR). For Session 1 attendees, bus transportation (bus fee assessed) will be provided from the Wyndham Albuquerque Hotel to WSMR Mon. (30 Oct) at 0600 with a return to the Wyndham in time for the evening reception (1800-2030). On Mon. (30 Oct) at KAFB, *Short Courses* will be conducted on HEL and HPM topics (course fee assessed). Session 2: *DE Vision 2000* (Public Domain) will convene on Tues. (31 Oct) at The University of New Mexico Conference Center. Session 2 will present a high-level overview of DE applications to the DoD future, with discussions of impacts to local/national communities and economies, potential research and technology partnership needs, and the needs of the people. A highlight of the day will be the reception (1800-1930) and annual DEPS Banquet (1900-2100) at the Wyndham Tues. evening (31 Oct) open to all Symposium registrants (banquet fee assessed). On Wed. (1 Nov), Session 3: *Basic Research* (Public Domain) and Session 4: *Requirements, Applications, and Programs* will be held concurrently at KAFB. Session 3 will include a Poster area. Concurrent discussions of HEL (Session 5) and HPM (Session 6) technologies and sources will be held at KAFB, all day Thurs. (2 Nov) and until noon on Fri. (3 Nov).

### **SECURITY**

The 3<sup>rd</sup> Annual DE Symposium is limited to cleared US government and US government contractors only with the exception of the Public Domain Sessions 2 and 3 (see inside for courses). Cameras, video or tape recorders, notebooks, briefcases, cellular phones, two-way pagers, laptop computers, and other recording media will not be permitted in the non-Public Domain sessions. These items will be checked at the session location and may be reclaimed when you leave. Security policies prohibit identification of some of the Symposium locations in advance. This information will not be available until the Symposium check-in/reception, Monday (30 Oct) 1800-2030 at the Wyndham Albuquerque Hotel.

**NOTE:** For the non-Public Domain sessions, a Symposium attendee roster will be distributed to cleared registrants within 30 days after the Symposium. To appear on the roster, you **MUST** be registered by **16 Oct 2000**. (See *DE Symposium Registration* for information on Visit Request and Registration Form.)



## **DE Symposium: Preliminary Program**

### **29 OCT (Sunday) — Session 1: HELSTF Activities Check-in Wyndham Albuquerque**

Check-in for ALL Session 1 registrants whether taking the bus to WSMR or driving — 1530-1730 at the Wyndham Albuquerque. To avoid delays and possible denial of entry to WSMR, everyone is strongly encouraged to take the bus. Non-Session 1 Symposium registrants are also welcome to check in during this time. (See the following page for details on Session 1.)

### **30 OCT (Monday) — Short Courses KAFB locations**

William E. Thompson, AFRL/DEP, Coordinator

Check-in at 0700 at the KAFB locations for HEL and HPM courses; morning/afternoon breaks onsite; lunch provided at the Coronado Club. *Course attendees may check-in 29 Oct, Sunday evening, to avoid delays on Monday morning.* Note: Courses 1-3 are FOUO; Course 4 is limited to cleared US Government and US Government contractors only.

#### **♦ 0800-1700 — Course 1: Lasers and Laser Optics**

Principal Trainer: Dr. Robert L. Hengehold (AFIT)

This course is designed to cover the basic concepts of lasers and laser systems for personnel with a BS in science/engineering, but with little laser background. It covers the basic physics of the laser medium, optics, beam propagation, and selected DoD laser systems. Although a BS (science/eng) is assumed, technicians and others working in the laser field should be able to gain much conceptual knowledge from this course.

#### **♦ 0800-1700 — Course 2: Acquisition, Tracking, and Pointing**

Principal Trainer: Dr. Paul Merritt (Boeing-SVS, Inc.)

This class will present the basic material needed to design and analyze a pointing and tracking system from target acquisition through fine pointing. The topics will include, performance equations, radio-metrics, the acquisition process, image processing, track algorithms, and gimbal pointing. The course will stay focused on technical topics and useful equations.

#### **♦ 0800-1200 — Course 3: Introduction to Optical Propagation**

Principal Trainer: Maj Eric P. Magee, PhD (AFIT)

The purpose of this course is to present an introduction of the physics governing optical wave propagation. It is intended to fill the needs of engineers and scientists new to the area of optical science. This course will enable the student to develop sufficient knowledge of optical propagation physics as well as a basic understanding of wave propagation through turbulence.

#### **♦ 0800-1700 — Course 4: HPM Effects and Vulnerability Assessment**

Principal Trainer: Dr. Michael G. Harrison (AFRL/DEHE)

The workshop will present an overview of the current understanding of the physics mechanisms involved in radio frequency coupling and interaction with electronics systems and an examination of experimental data obtained in AF measurement programs. Radio frequency effects at the component and circuit level of modern electronics will be described. The increasing interaction between experimental investigations and the modeling and the simulation world will be discussed and promising approaches to very difficult effects predictions problems presented. The results of recent effects measurement programs for a number of different target families will be presented along with the accompanying analysis.

### **30 OCT (Monday) — Reception and Symposium Check-in**

**Alvarado Ballroom, Wyndham Albuquerque Hotel (2910 Yale Blvd. SE)**

- ♦ 1800-2030 — Reception (*hors d'oeuvres, cash bar*) and Symposium check-in for all Symposium registrants for ALL sessions. The DEPS exhibition will be open in the ballroom.



The Directed Energy Professional Society (DEPS) was founded in 1999 to foster research and development of Directed Energy (DE) technology for national defense and civil applications through professional communication and education. DEPS intends to be the premier organization for exchange of information on the development and application of Directed Energy. For information on joining DEPS and to receive updates on the 3<sup>rd</sup> Annual DE Symposium, go to <http://www.deps.org> (membership information, contact Bonnie Wishart (tel 505-998-4910; fax 505-242-2249).

## **DE Symposium: Preliminary Program (cont)**

### **30 OCT — Session 1: HELSTF Activities at WSMR**

Session 1 Chair: Tony R. Marrujo, ASMDC

- ◆ 0600-1800 (departure from the Wyndham Albuquerque Hotel, front door; return arrival time is approximate)
- ◆ 0600 — Coffee and light refreshments at hotel before departure
- ◆ 1000 — Snack and 1-Star Briefing in HELSTF Cafeteria
- ◆ Tours and presentations: HELSTF, THEL, etc., followed by lunch
- ◆ 1400 — Departure for Wyndham Albuquerque; approximate arrival time - 1800

*Registration and Visit Requests are required for Session 1, whether you are taking the bus or driving your car. Everyone who will attend Session 1 and who is departing from Albuquerque is required to check-in at the Wyndham before departing. There will not be time Monday before the bus departs. Remember that a completed Symposium Registration form and Visit Request must be received by the Symposium Registrar in Albuquerque before you will be permitted at WSMR for the HELSTF Activities.*

**If you are a contractor and wish to attend the THEL portion of Session 1 (HELSTF Activities), please be advised that you will be required to sign a nondisclosure statement, which will be sent to you. It is essential that your Registration form and Visit Request be received by the 10/2/00 deadline. Thank you for your cooperation. Contact B. L. Daniels, Symposium Coordinator, when you see this to receive the form and additional information (505-272-7214; fax 505-272-7203; daniels@nmeri.unm.edu).**

### **31 OCT — Session 2: DE Vision 2000 (Public Domain)**

0700	Session 2 check-in	UNM Conference Center
0800	Welcome / Administrative	Session Chairs: Dr. R. Earl Good, AFRL/DE / Jess Granone, ASMDC
0820	Welcome / DEPS Overview	MGen. Donald L. Lamberson, PhD, DEPS President
0840	Keynote – DE Vision & Congress	Senator Pete Domenici (invited), NM
0940	<b>BREAK</b>	
1000	DE Vision Perspectives Panel:	Dr. Delores Etter, OSD (invited)
	Introduction/OSD	Dr. Delores Etter, OSD (invited)
	BMDO	LtGen. Ronald Kadish, BMDO (invited)
	AF	LtGen. Steven Plummer, SAF/AQ (invited)
	Army	LtGen. John Costello, ASMDC (invited)
	Navy	VAdm. George Nanos, Jr., Naval Systems Command
	USMC	Col. George Fenton, JNLW
	DOE	BGen. Thomas Gioconda, DOE (invited)
	Panel Questions/Summary	Dr. Delores Etter, OSD (invited)
1230	<b>LUNCH — Box lunch (provided by UNM SUB Catering)</b>	UNM Conference Center
1330	Keynote – Futuristic Vision	TBD
1500	<b>BREAK</b>	
1520	Program Overviews:	
	ABL	Col. Ellen Pawlikowski, SMC/TM
	GEL	Dr. Robert Q. Fugate, AFRL/DE
	SBL	Col. Neil McCasland, SMC/TL
	THEL	Jerry Wilson, ASMDC
1620	Future DE Workforce & Opportunities	DEPS Workshop
1715	Closing Remarks	Dr. R. Earl Good, AFRL/DE / Jess Granone, ASMDC
1730	Adjourn	Dr. R. Earl Good, AFRL/DE / Jess Granone, ASMDC

**NOTE:** The UNM Conference Center, the site of Session 2 is located at 1634 University Blvd. NE in Albuquerque, north of the intersection of University and Lomas, on the east side of University Blvd.



## DE Symposium: Preliminary Program (cont)

### 1 NOV — Session 3: BASIC RESEARCH (Public Domain)

0700	Session 3 check-in & Symposium check-in (continental breakfast)	KAFB location
0745	Welcome / Introduction	Session Chair: Dr. Jack Agee, AFOSR
0800	High Average Power Edge-Pumped Slab Lasers	Todd Rutherford (student), Stanford Univ.
0820	Semiconductor Quantum Dot Lasers	Dr. Luke F. Lester, UNM
0840	Kilowatt Average Power Laser with Sub-picosecond Pulses for Scientific Studies and Materials Processing	H. F. Dylla, Jefferson Lab
0900	Fiber Lasers	Dr. Ravi Jain, UNM
0920	Microdischarges	Sung-Jin Park (student), U. Illinois
0940	<b>BREAK AND POSTERS</b>	
1010	Femtosecond Lasers	Rohit Prasankumar (student), MIT
1030	Limits on Beam Quality That Can be Achieved by High Power HF Lasers	Dr. Kevin F. Fitzgerald, ANSER
1050	Basic Research and Education in High Power Microwave Sources and Effects	Dr. Edl Schamiloglu, UNM
1110	Role of Adaptive Optics vs Tracking in Improving Laser Performance in the Atmosphere	Don Washburn, AFRL/DEBA
1130	<b>LUNCH — Barbeque Buffet and special dessert! (Bus transportation provided)</b>	Hangar 760
1330	<b>POSTER SESSION (see list below)</b>	KAFB location
1410	Compensation Efficiencies of Conventional Tracking and Higher-Order Beam Control in Extended Turbulence	Dr. Matthew R. Whiteley, AFRL/DEBA
1433	Wavelength Selection for Naval HEL Weapons	Joung R. Cook, NRL
1450	Optically Turbulent Atmospheric Light Strings	J. V. Moloney, U. Arizona
1510	Characterization of Optical Turbulence in Complex Terrain	Frank D. Eaton, AFRL/DE
1530	<b>BREAK AND POSTERS</b>	
1545	UV Filaments: Potential for Diffractionless High Energy Beams	Jens Schwarz, UNM
1605	Experimental Evaluation of the Effects of High Power Radiation on Chem/Bio Warheads	Richard Erasquin, Raytheon
1625	Active Sensing of Space Objects Using Laser Radar	Deborah K. Werling, AFRL/DEBS
1645	Producing Small Laser Spot Size in a Vacuum	Richard W. Loose, MEVATEC, Inc.
1705	Full-Duplex Optical Communications Link Between Earth and the Space Shuttle Utilizing a Single Laser Beam	D. A. Hazzard (student), NMSU
1725	Closing Remarks	Dr. Jack Agee, AFOSR
1730	Adjourn	Dr. Jack Agee, AFOSR

### POSTERS

(1)	Relationship Between Intrinsic Laser Hardness and Molecular Structure and Composition	Dr. Robert F. Cozzens, NRL
(2)	TRW 10 kW Fiber Array Module Concepts	M. Wickham, TRW
(3)	Experiment to Investigate the Wake Contamination of Optical Turbulence Measured by Ascending Balloons	Lt. Patrick R. Kelly, AFRL/DEBA
(4)	Theory of Intermodulation in a Klystron	Y. Y. Lau, U. Michigan
(5)	Specific Training for Aviation Related Tactical Laser Exposure (STARTLE)	Lt. Thomas Jost, AFRL/HEDO
(6)	On the Possibility of Thermal Wake Contamination of Optical Turbulence Measurements Made by Ascending Balloons	Dr. Demos Kyrazis, R-Cubed
(7)	Triggering of Laser-Induced Electrical Discharges Using a Femtosecond UV Source	Patrick Rambo, UNM
(8)	An Earth to Shuttle Optical Communications Down-Link Using a Semiconductor Laser	J. MacCannell (student), NMSU
(9)	A Low Power Active Imaging System that Blocks the Flame from the Image of Burning Lithium Metal	T. M. Shay, NMSU

The Symposium Chair and Deputy Chair are grateful for the assistance of many for the success of the 3rd Annual DE Symposium. In particular, Michael W. Zmuda, AFRL/DEP, served as the overall Program Coordinator, assisting the Symposium Chairs and Session Chairs in formulating and integrating the preliminary program. Next, a special commendation to Barbara L. Daniels, Symposium Coordinator, Deborah G. Cole, Registrar, and the entire NMERI Team including the UNM Industrial Security Department. This exceptional NMERI team has provided expert planning of the million details that will lead to the success of this Symposium. Finally, we appreciate the willing assistance of the DEPS office staff, and the visionary leadership and support of DEPS Board and the DEPS committee members in establishing the annual DE Symposium.



## **DE Symposium: Preliminary Program (cont)**

### **1 NOV — Session 4: REQUIREMENTS, APPLICATIONS, AND PROGRAMS**

0700	Symposium check-in (continental breakfast)	KAFB location
0745	Welcome / Introduction      Session Chairs: Col. Ellen Pawlikowski, SMC/TM / Dr. William L. Baker, AFRL/DEH	
0755	Intelligence Information: Lasers	Dr. Ronald I. Miller, MSIC
0825	Intelligence Information: HPM	Joe Butler, NAIC
0855	Requirements: DDR&E Perspective	Dr. George W. Ullrich, DDR&E
0915	<b>BREAK</b>	
0930	Requirements: Counter Proliferation	DTRA
1010	Air Combat Command	ACC/DR
1030	Air Force Special Operations Command	AFSOC/DR
1050	Air Force Space Command	AFSPC/DR
1110	Air Force Mobility Command	AMC/DR
1130	<b>LUNCH — Barbeque Buffet and special dessert! (Bus transportation provided)</b>	Hangar 760
1330	Army CBDCOM	MGen. John Doesburg
1350	Other Army	TBD
1410	Advanced Tactical Laser	Dr. Vern Schlie, AFRL/DE
1440	Adjunct Missions for ABL	ABL SPO Rep.
1510	<b>BREAK</b>	
1525	SBL Affordability and Architecture	TBD
1555	DE ATAC Phase II Study/Implementation	Gen. Fogleman (Ret) / Bill Dungan, AFRL/DE
1625	HPM Active Denial Technology	Dr. Kirk E. Hackett, AFRL/DEHA
1655	DE Panel Discussion	
1730	Adjourn	Dr. William L. Baker, AFRL/DEH

## **DE Symposium: At-a-Glance**

	<b>Sun, 29 Oct</b>	<b>Mon, 30 Oct</b>	<b>Tues, 31 Oct</b>	<b>Wed, 1 Nov</b>	<b>Thurs, 2 Nov</b>	<b>Fri, 3 Nov</b>
<b>For complete information on sessions &amp; events, see the appropriate section in this Preliminary Program. Questions? Contact B.L. Daniels, Symposium Coordinator (505-272-7214; fax 505-272-7203; daniels@nmeri.unm.edu).</b>	<i>Session 1: HELSTF Activities</i> Bus to WSMR, depart 0600 from Wyndham, return appx. 1800.	<i>Session 2: DE Vision 2000</i> UNM Conference Ctr., 0800-1730. Check-in 0700. <b>Public Domain</b>	<i>Session 3: Basic Research</i> KAFB location, 0800-1730. Check-in 0700 ( <u>not</u> the same location as Session 4). <b>Public Domain</b>	<i>Session 5: HEL</i> KAFB location, 0800-1745. Check-in 0700 ( <u>not</u> the same location as Session 6).	<i>Session 5: HEL (concluded):</i> KAFB location, 0800-1200. Check-in 0700 ( <u>not</u> the same location as Session 6).	
	<i>Short Courses: Two KAFB locations. Courses 1 &amp; 2: 0800-1700, FOUO Course 3: 0800-1200, FOUO Course 4: 0800-1700, cleared US Govt &amp; US Govt contractors only</i>		<i>Session 4: Requirements, Applications, Programs, &amp; Intel</i> KAFB location, 0800-1730. Check-in 0700 ( <u>not</u> the same location as Session 3).	<i>Session 6: HPM</i> KAFB location, 0800-1730. Check-in 0700 ( <u>not</u> the same location as Session 5).	<i>Session 6: HPM (concluded):</i> KAFB location, 0800-1200. Check-in 0700 ( <u>not</u> the same location as Session 5).	
	Lunch is included in Course fee, 1200-1245.	Lunch at Center, included in Symposium fee, 1230-1300.	Lunch at Hangar 760, included in Symposium fee, 1130-1330. Tours and exhibits.	Lunch at Hangar 760, included in Symposium fee, 1130-1330. Tours and exhibits.		3 <sup>rd</sup> Annual DE Symposium ends 1200.
	Symposium check-in 1530-1700 Wyndham Albuquerque Hotel (required for Session 1 attendees)	Reception/check-in, 1800-2030, Wyndham. Exhibits	Reception/check-in, 1800-1930, Wyndham. DEPS Banquet, 1900-2100, Wyndham.	SOR (Starfire Optical Range) tour, 1730-2000 (sign up at Symposium). Departure from and return to KAFB location parking lot.	SOR (Starfire Optical Range) tour, 1730-2000 (sign up at Symposium). Departure from and return to KAFB location parking lot.	

**See you in 2001!!**



## **DE Symposium: Preliminary Program (cont)**

### **2 NOV — Session 5: HEL TECHNOLOGIES AND SOURCES**

0700	Symposium check-in (continental breakfast)	KAFB location
0745	Welcome / Introduction	Session Chair: Dr. Vern A. Schlie, AFRL/DE
	Section 1: HEL Technologies: Laser HEL Device Technology	
0800	◆ Advanced COIL Laser Technology Including AGIL (Azide Based)	C. Helms, AFRL/DELC
0820	◆ Electrochemical COIL – The Battlefield Laser Weapon Comes of Age	B. Otey, ASMDC
0840	◆ TRW 10-Kw Fiber Array Module Concepts	M. Wickham, TRW
	Section 2: HEL Programs	
0900	◆ Airborne Laser Program, Laser Module 1 Test Program	G. Koop, TRW
0920	◆ Complementary Roles for HEL Weapons in Ship Defense	Joung R. Cook, NRL
0940	◆ Advanced Tactical Laser: Advanced Concept Technology Demonstration	J. Bradshaw, ASMDC
1000	<b>BREAK</b>	
1020	◆ Overview of Space-Based Laser Integrated Flight Experiment (SBL IFX)	B. Waldman, Boeing
1040	◆ SBL IFX Laser Payload Element (Laser) Progress	D. Fitzgerald, TRW
1100	◆ HEL Affordability and Architecture Study Overview	A. Kraemer, Lockheed-Martin
1130	<b>LUNCH — Mexican Buffet and special dessert! (Bus transportation provided)</b>	<b>Hangar 760</b>
1330	◆ Laser Concepts Evaluated During the HEL Affordability and Architecture Study	J. Sollee, TRW
1350	◆ HEL AAS Technology Investment Plan Overview	Gary Segal, TRW
1410	◆ Integrated Performance and Cost Spreadsheet (IPACS), a Tool Designing Minimum Life Cycle Cost HEL NMD Systems	S.G.L. Williams, Lockheed-Martin
1430	◆ Simple Nomograph for Designing High-Energy Laser NMD Systems	K.L. Zondervan, Aerospace Corp.
1450	◆ HEL AAS Constellation Performance Against Stressing (NMD, TMD, and Space Control) Scenarios	K. Sun, SMC/TL
1510	<b>BREAK</b>	
	Section 3: Optical Components	
1525	◆ Advanced Ceramic Matrix Composites for Space Mirror Application	B. Patterson, Honeywell
1545	◆ ABL Large Optics	L. Harkless, LMSS
	Section 4: Beam Control Technology	
1605	◆ Beam Control Element for the Space Based Laser Integrated Flight Experiment	W. F. Otto, Boeing
1625	◆ Weather Support to USAF Airborne Laser	M. Johnson, ABL SPO
1645	◆ Effects of Clouds on Tactical HEL Missions	Dave Nahrstedt, Boeing LEOS
1705	◆ Tactical Beam Control Systems Applicable with HEL on Fighters, JSF, and UCAV	Paul Merritt, SVS
1725	◆ Advances in ABL's Beam Control System	K. W. Billman, Lockheed-Martin Space Systems
1745	Adjourn	Dr. Vern Schlie, AFRL/DE

### **2 NOV — Session 6: HPM SOURCES AND TECHNOLOGIES**

0700	Symposium check-in (continental breakfast)	KAFB location
0745	Welcome / Introduction	Session Chair: Dr. Al Kehs, ARL
	Service Overviews:	
0800	◆ Air Force	Dr. William L. Baker, AFRL/DE
0830	◆ Army-ARL	Dr. Edward P. Scannell, ARL
0845	◆ Army-SMDC	Larry L. Altgilbers, ASMDC
0900	◆ Navy-NRL	Dr. Preston Grounds, NRL
0915	◆ Navy-NSWC	Dr. David Stoudt, NSWC
0930	◆ LANL	Dr. Michael Fazio, LANL
0945	<b>BREAK</b>	
1000	◆ User Perspectives: General Users	Capt. James R. Powell, NPGS
	Intel:	
1030	◆ National Intelligence Estimate (NIE)	Dr. Ron Pandolfi, CIA
1045	◆ Foreign Research on Biological Effects of Radio-Frequency Weapons	Dr. Jose F. Pina, CIA
1100	◆ High-Power MW Research in Asia	Dr. Jeffrey J. Hamilton, CIA
1115	◆ Radio-Frequency Testing Facility in Europe	Philip J. Winchell, NAIC
1130	<b>LUNCH — Mexican Buffet (bus transportation provided)</b>	<b>Hangar 760</b>
1330	◆ RF Weapons Development Worldwide	Lt. Mark A. W. Lare, NAIC



## **DE Symposium: Preliminary Program (concluded)**

### **2 NOV — Session 6: HPM SOURCES AND TECHNOLOGIES (cont)**

1345	Effects: Overview	Dr. Michael G. Harrison, AFRL
1415	♦ Modeling & Simulation: Overview	Dr. Thomas Hussey, AFRL
1430	— Estimation of RF Probability of Effect	Maj. Thomas Dipp, AFRL
1445	— Modeling of HPM-Induced EM Environments Inside a Concrete Structure	Dr. David Dietz, AFRL/DEHE
1500	— NEC Modeling of Transient Radiation and Structure Penetration Over Ground	Robert S. Thompson, NPGS
1515	<b>BREAK</b>	
1530	♦ High-Power MW Vulnerability Field Test of a Rotary Wing Aircraft	Richard J. Carter, OSD-LFT&E
1545	♦ Database	Scott C. Griffiths, NSWC
1600	♦ Wargames	Dr. Edward P. Scannell, ARL
1615	♦ Bioeffects	Dr. Michael Murphy, AFRL
1645	Hardening & Safety: Overview	LCDR Daniel Devany, DTRA
1715	Concluding Remarks	Dr. Al Kehs, ARL
1730	Adjourn	Dr. Al Kehs, ARL

### **3 NOV — Session 5: HEL SOURCES AND TECHNOLOGIES (concluded)**

0700	Symposium check-in (continental breakfast)	KAFB location
0745	Welcome / Introduction	Session Chair: Dr. Vern Schlie, AFRL/DE
	Section 5: HEL Effectiveness Assessment	
0800	♦ Modeling the Effectiveness of Ground-Based Tactical Lasers	Chuck LaMar, ASMDS
0830	♦ Vulnerability of Short Range Artillery to Ground-Based Tactical Lasers	Chuck LaMar, ASMDS
0900	♦ Experimental Evaluation of the Effects of HP Laser Radiation on Chem / Bio Warhead	Richard Erauquin, Raytheon
0930	♦ HEL Effects Data Critical to Tactical HEL Missions	Dr. Larry Grimes, AFRL/DELE
1000	<b>BREAK</b>	
	Section 6: Laser Intelligence Assessments	
1020	♦ Foreign Air Defense Laser Weapons: Anti-Sensor Applications and Proliferation	Pete Varmette, DIA / MSIC
1040	♦ Foreign Beam Control Developments	Capt. Jason Tellez, USAF / NAIC
1100	♦ Foreign COIL Development	Lt. Ty Perschbacher, USAF / NAIC
1120	♦ Chinese Laser Program	Linda Baker, NIMA
1140	♦ Chemical Laser R&D Facility in Asia	Jesse Phillips, USAF / NAIC
1200	Adjourn	Dr. Vern Schlie, AFRL/DE

### **3 NOV — Session 6: HPM SOURCES AND TECHNOLOGIES (concluded)**

0700	Symposium check-in (continental breakfast)	KAFB location
0745	Welcome / Introduction	Session Chair: Dr. Al Kehs, ARL
	Hardening & Safety (concluded)	
0800	♦ DEW Safety Assessment Methodology Development	M. A. Dinallo, AFSC
0815	♦ Inserting RF-DEW into STARS	John A. Mitten, DoD/IG
0830	♦ Mitigation of Radio-Frequency Energy Effects	M. Brown, ASMDC
0845	Technology Sources: Overview	Alan Bromborsky, ARL
0915	♦ UWB	William D. Prather, AFRL
0930	<b>BREAK</b>	
0945	Explosive-driven sources	Dr. James Degnan, AFRL
1000	Antennas: Overview	Dr. Marc Litz, ARL
1030	♦ Compact, Lightweight, Steerable, Foldable HPM Antenna	Dr. Robert A. Koslover, ARL
1045	Power / Modulators: Overview	Dr. Richard Adler, NorthStar
	Systems: Status, Challenges, Lessons Learned	
1115	♦ ADT	Dr. Kirk E. Hackett, AFRL
1130	♦ ACTD and Lessons Learned	Dr. Harald O. Dogliani, LANL
1145	♦ GVS	Carl Lazard, LANL
1200	Adjourn	Dr. Al Kehs, ARL



## DE Symposium Registration

**FOR ALL SESSIONS / COURSES:** The 3rd Annual DE Symposium includes both Public Domain sessions and sessions limited to cleared US Government and US Government contractors only. Three Short Courses are FOUO and one is limited as above. Registration is required for all attendees and speakers for ALL sessions and courses. All Symposium Registration forms and Visit Requests (security clearance form) must be received by Deborah G. Cole, Symposium Registrar (DE Symposium 2000, NMERI/UNM, 901 University SE, Albuquerque, NM 87106; fax 505-272-7203; dcole@nmeri.unm.edu) no later than **2 Oct to receive the lower rate and to ensure a place**. A Visit Request form is included in this Preliminary Program for your convenience or you may use your own if it provides the same information as this example. If you have security questions, contact Greg Hallstrom (505-272-7210; e-mail, greggh@unm.edu). Symposium check-in (not registration) sessions are scheduled for 29, 30, and 31 Oct (evenings only) at the Wyndham Albuquerque Hotel. Attendees may also be checked-in beginning at 0700 each day at the location of the each session/ course.

**Questions may be addressed to Barbara L. Daniels, DE Symposium Coordinator (address as above, tel 505-272-7214; fax 505-272-7203; daniels@nmeri.unm.edu).**

**PUBLIC DOMAIN:** Sessions 2 and 3 are open to everyone; however, a registration form is required by the deadline, with payment. All who are registered for these sessions will receive a badge admitting them to the sessions and to the lunches provided both 31 Oct and 1 Nov. The lunch on 1 Nov will be a barbecue at Hangar 760 with the attendees of Session 4 (cleared US Govt and US Govt contractors only). Round-trip bus transportation will be provided from Sessions 3 and 4 to the lunch site at Hangar 760. At the conclusion of the lunch, be sure to board the bus posted for your session. Those registered for only Session 3 (Public Domain) will not be permitted to attend Session 4.

**In completing the registration form**, please provide all the information requested. Specifically, we need to know which sessions of the concurrent ones you will be attending the majority of the time. The sessions are in locations sufficiently distant to require transportation to move between them, so we need to plan both the transportation and the catering. We also provide transportation at the beginning and ending of each day from the Wyndham to KAFB locations. If you wish to ride this bus, please check the box on the registration form. It is not necessary to have a car while on the base as transportation is provided to all locations.

**CANCELLATION / REFUND POLICY:** Cancellations must be submitted in writing with a copy of your registration form and received (not postmarked) by the Coordinator (B.L. Daniels, NMERI/UNM) no later than **16 Oct 2000**. Telephone cancellations will not be accepted. Cancellations may be faxed (505-272-7203). There will be no exceptions. Valid refunds are issued after the Symposium minus a \$50 administrative fee.

**NOTE:** *DEPS reserves the right to cancel the Symposium courses if there are insufficient registrations as of 16 Oct 2000. In such an event, course and tour fees will be refunded in full. DEPS liability is limited to the return of such fees.*

## DE SYMPOSIUM HOTEL

Wyndham Albuquerque Hotel  
2910 Yale Blvd. SE  
Albuquerque, NM 87106  
(505-843-7000)  
Ask for the Reservations Agent

A roomblock has been reserved from 29 Oct. through 3 Nov for \$60/single, \$80/double at the Wyndham Albuquerque Hotel. When making your reservation, identify yourself as a participant in the **3<sup>rd</sup> Annual Directed Energy Symposium**. To ensure the special Symposium rates, reserve by **8 Oct**. Shuttle service is available between the airport and the Wyndham Albuquerque Hotel (call the hotel from the baggage claim area or walk out the front door and proceed about 1 block northwest). The Symposium evening check-in sessions (29, 30, & 31 Oct), evening receptions (30 & 31 Oct), and DEPS Banquet (31 Oct) will be held in the hotel. The bus for WSMR for the HELSTF Activities (Session 1) will depart from and return to the hotel Monday (30 Oct). **Website: [www.wynatabq.com](http://www.wynatabq.com); fax: 505-246-8188.**



## **DE Symposium: Visit Request**

**3rd Annual Directed Energy Symposium, 30 Oct - 3 Nov 2000**

Return this Visit Request with Registration form to Deborah G Cole, Registrar, DE Symposium 2000,  
**not later than 2 Oct 2000** (tel: 505-272-7215; fax: 505-272-7203).

(This form must be completed and submitted by each cleared Symposium participant.)

Name: \_\_\_\_\_  
(First) (Middle) (Last)

Company/Organization Name: \_\_\_\_\_

Mailing Address: \_\_\_\_\_

City/State/Zip Code: \_\_\_\_\_

Telephone: \_\_\_\_\_ Fax: \_\_\_\_\_ E-mail: \_\_\_\_\_

Date of Birth: \_\_\_\_\_

Place of Birth: \_\_\_\_\_

SSN: \_\_\_\_\_

Clearance Level: \_\_\_\_\_

Date of Visit: \_\_\_\_\_

Purpose of Visit: **3<sup>rd</sup> Annual Directed Energy Symposium**

Location: **Kirtland Air Force Base and White Sands Missile Range, New Mexico**

Sponsoring Organization: **Directed Energy Professional Society (DEPS)**

### **Contractor Facilities Only:**

Cage Code \_\_\_\_\_ Facility Security Clearance Level \_\_\_\_\_

**I certify that the applicant has been granted a final security clearance of Secret or higher, is a United States Citizen, and the company (if applicable) is not foreign-owned or controlled.**

Security Officer's Signature \_\_\_\_\_ Printed Name \_\_\_\_\_

Telephone \_\_\_\_\_ Fax \_\_\_\_\_ Date \_\_\_\_\_

### **Privacy Act Statement (Authority 5 USC 301) Principal Purpose or Purposes**

The primary purpose of this form is to verify security clearance for access to classified briefings.

Social Security number (SSN) is required to identify participants. Disclosure of information, including SSN, is voluntary. Failure to provide such information will result in denial of participation in conference involving access to classified information.



## DE Symposium: Registration Form

Please fill out the form completely, including payment information, and forward with payment and Visit Request to Deborah G. Cole, DE Symposium Registrar, NMERI/UNM (address below).

**Registrant (print or type, and provide ALL information requested):**

Name \_\_\_\_\_

Organization \_\_\_\_\_

Title / Position \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_

State \_\_\_\_\_ Country \_\_\_\_\_ Zip \_\_\_\_\_

Tel (day) \_\_\_\_\_ Fax \_\_\_\_\_ E-mail \_\_\_\_\_

Please indicate the concurrent sessions in which you will spend 60-100% of your time. The information will facilitate on-base transportation planning. Thank you.

1 Nov: Sessions 3 - Basic Research \_\_\_\_\_ or 4 - Requirements, Applications, Programs \_\_\_\_\_ ?

2-3 Nov: Sessions 5 - HEL \_\_\_\_\_ or 6 - HPM \_\_\_\_\_ ?

**Will you take the bus to and from the Wyndham to KAFB meeting sites? Yes \_\_\_\_\_ No \_\_\_\_\_**

**3rd ANNUAL DE SYMPOSIUM (30 Oct - 3 Nov 2000) - Registration required for all!**

**FULL SYMPOSIUM (Sessions 1-6 and receptions)** Before 10/2 10/2 - 10/23

- ◆ Government (government fee applies only to active duty military and civil service personnel with government identification cards) \$325 \_\_\_\_\_ \$400 \_\_\_\_\_
- ◆ Industry, educational institutions, etc. (non-DEPS members) \$400 \_\_\_\_\_ \$475 \_\_\_\_\_
- ◆ DEPS Member - DEPS Member No. \_\_\_\_\_ (this no. must be provided to receive the DEPS member rate) \$350 \_\_\_\_\_ \$400 \_\_\_\_\_

**SESSIONS 2 & 3 ONLY (PUBLIC DOMAIN)**

- ◆ Full-time university students with ID \$30 \_\_\_\_\_ \$40 \_\_\_\_\_
- ◆ All others \$100 \_\_\_\_\_ \$125 \_\_\_\_\_

**SESSION 1: HELSTF ACTIVITIES** (limited to cleared US Govt and US Govt contractors only)

**PLEASE CHECK IF ATTENDING** \_\_\_\_\_

Fee applies only if you will take the bus from the Wyndham Albuquerque (round trip). \$50 \_\_\_\_\_

**(If you are a contractor and will be attending Session 1, see p. 4 in this program.)**

**SHORT COURSES (30 Oct Mon.) - lunch will be provided to all course registrants**

- ◆ 0800-1700 Course 1: Lasers and Laser Optics (FOUO) \$125 \_\_\_\_\_
- ◆ 0800-1700 Course 2: Acquisition, Tracking, and Pointing (FOUO) \$125 \_\_\_\_\_
- ◆ 0800-1200 Course 3: Introduction to Optical Propagation (FOUO) \$75 \_\_\_\_\_
- ◆ 0800-1700 Course 4: HPM Effects and Vulnerability Assessment (limited to cleared US Govt and US Govt contractors only) \$125 \_\_\_\_\_

**DEPS BANQUET (31 Oct Tues.) - Registrant @ \$35 \_\_\_\_\_ + guest @\$35 \_\_\_\_\_ = total Banquet \$ \_\_\_\_\_**

**TOTAL (US funds) \$ \_\_\_\_\_**

- ◆ **Check made payable to DEPS** (checks drawn on a US Bank and issued in US Dollars) \$ \_\_\_\_\_ / Check No. \_\_\_\_\_

- ◆ **Credit Card:** ☐ VISA ☐ MASTERCARD ☐ AMERICAN EXPRESS

Account Number \_\_\_\_\_

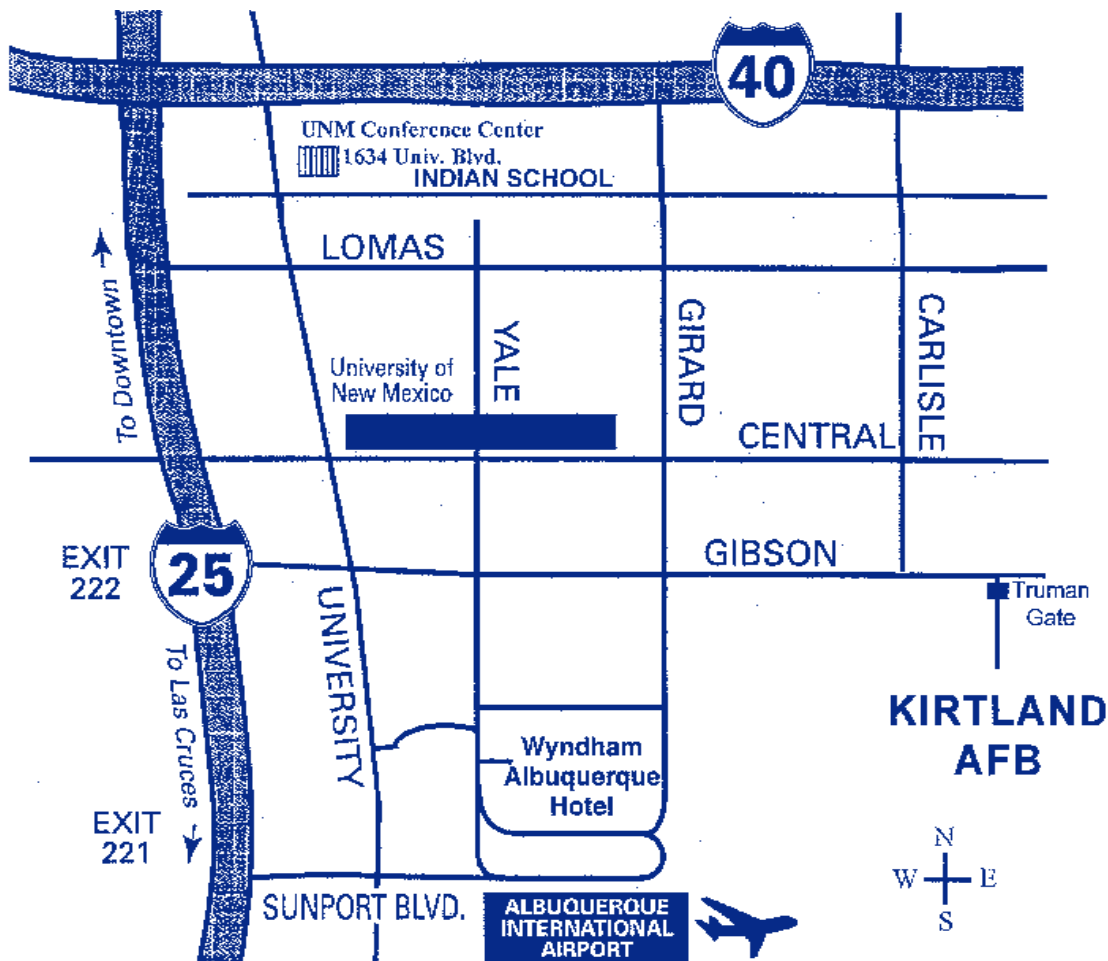
Cardholder's Name (Please Print) \_\_\_\_\_

Authorized Signature \_\_\_\_\_

Exp. Date \_\_\_\_\_

**Please return this registration form with payment and Visit Request to:**  
3<sup>rd</sup> Annual DE Symposium  
NM Engineering Research Institute/UNM  
901 University Blvd. SE  
Albuquerque, NM 87106  
ATTN.: Deborah G. Cole, Registrar  
fax: 505-272-7203





*The Directed Energy Professional Society (DEPS) was founded in 1999 to foster research and development of Directed Energy (DE) technology for national defense and civil applications through professional communication and education. DEPS intends to be the premier organization for exchange of information on the development and application of Directed Energy. For information on joining DEPS and to receive updates on the 3<sup>rd</sup> Annual DE Symposium, consult the web site: <http://www.deps.org> (membership information, contact Bonnie Wishart (tel 505-998-4910; fax 505-242-2249).*



**DEPS**  
**PO Box 9874**  
**Albuquerque, New Mexico**  
**87119-9874 USA**

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